

Background material for presentation on The Gulf of Alaska Report Card

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TOR 5: Ecosystem modelling

The Center provides LME-scale ecosystem assessments and indicators to inform the North Pacific Management Council's annual groundfish quota-setting process. The assessments are based on myriad ecosystem indicators, developed by both Center scientists as well as scientists from other agencies, research groups, and academia. Ecosystem indicators are developed in collaboration with stakeholders, and are based on survey data, model outputs, and forecasts that are synthesized on an annual scale to align with the temporal scale of federal fisheries management in Alaska. The indicators of interest range from broad-scale climate indices to those representing the experience of humans living in the ecosystem of interest, and all trophic levels in between.

For the Gulf of Alaska, the status of the ecosystem as relevant to inform fisheries managers is represented in both detailed descriptions of ecosystem indicators as well as an integrative assessment of the ecosystem. These are further summarized in a Report Card, which was presented to the North Pacific Fisheries Management Council for the first time for the Gulf of Alaska in 2015. The format followed those that were developed in previous years for the Eastern Bering Sea and Aleutian Islands, although the report cards for each LME have varied to reflect the particular marine processes, data availability, and indicator selection process for each region. Based on recommendations from the Scientific and Statistical Committee of the Council, the team of ecosystem experts used to select indicators for the Report Card was larger than those used previously in other regions in order to broaden the expertise of those involved. Thus, the Center used an online form to solicit input on indicator selection. There were 44 experts that participated in the indicator selection.

For the preliminary report card, indicators were selected based simply on the level of support for each type of indicator in the range of trophic categories. Best available data were used to represent or in some cases develop these indicators. Following review by the Council, the preliminary Report Card was reviewed in a workshop format by the GOA Integrated Ecosystem Research Program Synthesis Team in March 2016. The Team decided to split the Report Card into two regions, East and West, to better capture the ecosystem differences at this spatial scale. The selected indicators were reviewed and refined. In some cases, development of new, model-derived indicators were recommended to replace more narrowly-focused data-based indicators.

TOR 6 : Inclusion of advice

The Gulf of Alaska Report Card, along with the Ecosystem Considerations Report in which it is contained, aims to provide a holistic, LME-scale assessment to the Council. The Gulf of Alaska Groundfish Plan Team reviews the Report while making ACL recommendations, to determine whether precautionary adjustments to ACLs should be recommended based on ecosystem status or trends. At the meeting of the Scientific and Statistical Committee, the ecosystem information is deliberately presented

immediately ahead of the individual stock assessments, with the purpose of provided ecosystem context to the following discussions of single-species stock status. While the information provided within the Report Cards and assessments is based on quantitative analyses, it is conveyed within a qualitative format to spur discussion and set context for later deliberations. While there is progress in including ecosystem information into individual stock assessments as possible, the holistic discussion of ecosystem considerations, including those represented in the Report Card, allows for qualitative synthesis that can capture events outside the bounds of current models and to detect the impacts of unexpected events, such as the recent unprecedented warming in the Gulf of Alaska. The Report Card allows for a rapid assessment of recent trends across climate, oceanography and ecosystem indicators, and the accompanying synthesis in the assessment allows for highlighting red flags, or concerns of management interest.

TOR 7: Review

The Gulf of Alaska Report Card was initially developed based on a broad array of Gulf of Alaska ecosystem experts ranging from oceanographers to seabird biologists to ecosystem modellers. These experts served as peer review for the purposes of selecting indicators to best represent the ecosystem status of the Gulf. The next level of review was by the Plan Teams and Scientific and Statistical Committee of the Council, which together also represent a wide array of ecosystem and management expertise. Formal comments by both of these committees are received as part of the annual review of the Ecosystem Considerations Report, of which the Gulf of Alaska Report Card is a part. The annual review by the SSC is included in the report, along with the editor's responses. This annual review and response contributes to the adaptive nature of the entire report, which allows for newly developed indicators to seamlessly replace older ones as needed.

The Gulf of Alaska Report Card received further review and refinement by the GOA IERP Synthesis Team as detailed above. There is also a manuscript in progress for publication in peer-reviewed scientific journal describing and contrasting the development of the report cards for the Eastern Bering Sea, Aleutian Islands, and the Gulf of Alaska.

TOR 8: Communication

The Gulf of Alaska Report Card will be presented annually by the Council Plan Teams and SSC, along with the rest of the Ecosystem Considerations Report. Ideally, the indicators in the Report Card will be able to be updated annually, preferably within the same year, but no more than 1 year behind. The Center has established a history of regular ecosystem presentations with the groundfish Plan Teams, SSC, and more recently, the Crab Plan Teams. I make approximately 7-8 individual presentations of ecosystem information, including the Report Cards, to various Council committees every year, in addition to presentations at scientific conferences and other workshops. The Center recently debuted an updated [website](#) that reflects the recent push to move away from Alaska-wide assessments and indicators to separate LME- based assessments, report cards and indicators. One goal is to have all indicator time-series available on this website. At present, the Report Card indicators, including the Gulf of Alaska indicators, are available to view or [download](#).